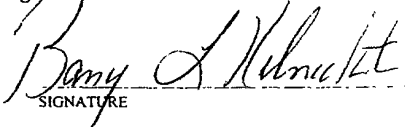


FORM PTO-1390 (REV 10-96)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER <b>99-260</b>
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <b>09/284816</b>
INTERNATIONAL APPLICATION NO. <b>PCT/IB96/01171</b>	INTERNATIONAL FILING DATE <b>October 31, 1996</b>	PRIORITY DATE CLAIMED	
TITLE OF INVENTION <b>FERMENTED BEVERAGE WITH BEER WORT BASE, METHOD FOR PREPARING SAME</b>			
APPLICANT(S) FOR DO/EO/US <b>PHILIPPE MALCORPS ET AL.</b>			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</li> <li><input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</li> <li><input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</li> <li><input type="checkbox"/> has been transmitted by the International Bureau.</li> <li><input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li><input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</li> <li><input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> <li><input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</li> <li><input type="checkbox"/> have been transmitted by the International Bureau.</li> <li><input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li><input type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li><input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li><input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). <b>(INFORMAL)</b></li> <li><input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>			
Items 11. to 16. below concern document(s) or information included:			
<ol style="list-style-type: none"> <li><input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</li> <li><input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</li> <li><input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</li> <li><input type="checkbox"/> A substitute specification.</li> <li><input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li><input checked="" type="checkbox"/> Other items or information: <b>International Preliminary Examination Report including translation thereof</b> <b>Form PCT/IB/308</b> <b>Form PCT/IB/301</b> <b>Form PCT/IB/332</b> <b>Form PCT/RO/101</b></li> </ol>			
I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail in an envelope addressed to, Commissioner of Patents and Trademarks, Washington, DC 20231 on <b>April 21, 1999</b> (Name and Reg. No. of Attorney) <b>Nicole Porto</b> Signature <b>April 21, 1999</b> Date of Signature			
EXPRESS MAIL NO.: <b>EL194866823US</b>			

US

U.S. APPLICATION NO (if known, see 37 CFR 1.5)		INTERNATIONAL APPLICATION NO <b>PCT/IB96/01171</b>		ATTORNEY'S DOCKET NUMBER <b>99-260</b>	
17. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):</b> Search Report has been prepared by the EPO or JPO ..... \$910.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... \$700.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$770.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$1040.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$96.00  <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				CALCULATIONS    PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	21 - 20 =	1	<del>X \$18.00</del> \$18.00	\$	18.00
Independent claims	1 - 3 =	-	<del>X \$80.00</del>	\$	--
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$260.00	\$	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$	858.00
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				\$	--
<b>SUBTOTAL =</b>				\$	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	130.00
<b>TOTAL NATIONAL FEE =</b>				\$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$	--
<b>TOTAL FEES ENCLOSED =</b>				\$	988.00
				Amount to be:	\$
				refunded	
				charged	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>988.00</u> to cover the above fees is enclosed.					
b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.					
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>02-0184</u> . A duplicate copy of this sheet is enclosed.					
<b>NOTE:</b> Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO <b>Barry L. Kelmacher</b> <b>BACHMAN &amp; LaPOINTE, P.C.</b> <b>900 Chapel Street, Suite 1201</b> <b>New Haven, CT 06510-2802</b>			 SIGNATURE <b>Barry L. Kelmacher</b> NAME <u>29,999</u> REGISTRATION NUMBER		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : PHILIPPE MALCORPS Docket No.: 99-260  
ET AL.

Serial No. : Examiner :

Filed : Art Unit :

For : FERMENTED BEVERAGE WITH  
BEER WORT BASE, METHOD  
FOR PREPARING SAME

900 Chapel Street  
Suite 1201  
New Haven, CT 06510-2802

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks  
United States Patent and Trademark Office  
Washington, D.C. 20231

Dear Sir:

Prior to the initial office action in the above newly  
filed patent application, amend said application as follows:

IN THE SPECIFICATION:

On page 1, insert --BACKGROUND OF THE INVENTION--  
before the first line of the specification.

On page 2, insert the following between lines 28 and  
29.

--A method is known from WO 96/04363 for improving the  
stability of the foam produced by some beverages such as  
beer, consisting in adding one or more pectins during or  
after the process of preparing such a beverage.

It is also known that other polysaccharides have the

same property, for example gums or modified starches or cellulose derivatives.

It is also known that the addition of a carrageenan to a hot wort stimulates the coagulation of the soluble proteins contained in this wort and facilitates the sedimentation of the proteins and therefore the clarification of the beer.

#### SUMMARY OF THE INVENTION--

On page 7, insert --BRIEF DESCRIPTION OF THE DRAWINGS-- between lines 22 and 23.

On page 8, insert --DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)-- between lines 16 and 17.

On page 14, line 10, delete "λ" and insert --E 407-- in its place; and line 13, delete "Q40" and insert --E 440-- in its place.

#### IN THE CLAIMS:

Cancel claims 1-18 without prejudice and insert new claims 19-39 in its place.

--19. Use, in a beer wort or in a fermented beverage prepared from the said beer wort, of at least one

polysaccharide which is at least slightly soluble in water, characterized in that there is used either a polysaccharide capable of forming complexes with protein fractions of the said wort or of the said beverage, in order to inhibit the coagulation and the precipitation of proteins, or alternatively a polysaccharide capable of forming a suspension in the said wort or the said beverage, in order to prepare a fermented beverage of the beer type having a permanent haze at room temperature and/or a reversible cold haze having respectively predetermined characteristics in terms of intensity and persistence over time in the event of storage.

20. Use according to claim 19, characterized in that the polysaccharide is chosen from starch derivatives.

21. Use according to claim 19, characterized in that the polysaccharide is chosen from modified starches E 1404 to E 1450.

22. Use according to claim 19, characterized in that the polysaccharide is chosen from pectins of the E 440 type or from derivatives thereof.

23. Use according to claim 22, characterized in that a pectin is introduced into the wort when hot so as to create a permanent haze.

24. Use according to claim 22, characterized in that a pectin is introduced into the beer when finished so as to slow down the speed of sedimentation of the reversible cold haze and to maintain the said cold haze in suspension.

25. Use according to claim 22 characterized in that a pectin is added in a proportion of between about 10 and about 1000 mg/l.

26. use according to claim 25, wherein said pectin is added in a proportion of between about 50 and about 500 mg/l.

27. Use according to claim 25, wherein said pectin is added in a proportion of the order of from 100 mg/l to about 300 mg/l.

28. Use according to claim 19, characterized in that the polysaccharide is chosen from carrageenans of the E 407 type and is introduced into the beer when finished so as to form a permanent haze and to stabilize the cold haze.

29. Use according to claim 28, characterized in that a carrageenan, which is highly reactive, is added in a proportion of at least about 5 mg/l.

30. Use according to claim 28, characterized in that a carrageenan, which is highly reactive, is added in a proportion of the order of about 10 mg/l.

31. Use according to claim 19, characterized in that the polysaccharide is chosen from gums selected from the group consisting of the gums E 400, E 401, E 402, E 403, E 404, E 405, E 413, E 415 or E 416, and gum acacia, and is preferably introduced into the beer in finished form so as to stabilize and maintain the reversible cold haze in suspension.

32. Use according to claim 31, characterized in that a gum which is weakly reactive is added in a proportion of the order of about 100 mg/l.

33. Use according to claim 32, wherein said gum is gum acacia.

34. Use according to claim 19, characterized in that the polysaccharide is added in a proportion of between about 5 mg/l and about 2000 mg/l of wort or of beer, the

proportion to be used varying in an inverse proportion of the degree of reactivity and the degree of purity of the polysaccharide, and being dependent on the time when the polysaccharide is used.

35. Use according to claim 34, wherein said proportion of said at least one polysaccharide is between about 10 mg/l and about 1000 mg/l.

36. Use according to claim 34, wherein said proportion of said at least one polysaccharide is between about 50 mg/l and 500 mg/l.

37. Use according to claim 19, characterized in that the nature and the quantity of the at least one polysaccharide and the conditions for adding the said product are chosen so as to create protein particles having a mean diameter of about 0.3  $\mu\text{m}$ .

38. Method for preparing a fermented beverage of the beer type from a beer wort, characterized in that said method comprises a step consisting of a use according to claim 19.



39. Fermented beverage of the beer type prepared from a beer wort, characterized in that it was prepared using the method according to claim 38.--

IN THE APPLICATION:

Please add the following Abstract to the application following the claims.

--Abstract of the Disclosure

The invention concerns a fermented beverage, with beer wort base, characterized in that it comprises a natural or synthetic additive, the additive being capable of forming at least temporarily stable complexes with the proteinic fractions of the wort or of the resulting beverage or of forming a suspension at least temporarily stable in the wort or the beverage, the additive being further present in the fermented product, at least during its preparation, in a proportion sufficient for obtaining a satisfactory cloudiness in the finished beverage.--

R E M A R K S

By the present amendment, certain headings have been inserted in the text of the application and an Abstract has been added. Further, original claims 1-18 have been replaced by new claims 19-39. The new claims correspond to claims 1-14, which were indicated as having novelty, inventive step and industrial applicability in the

International Preliminary Examination Report. The extra claims arise out of conforming said claims 1-14 to U.S. practice.

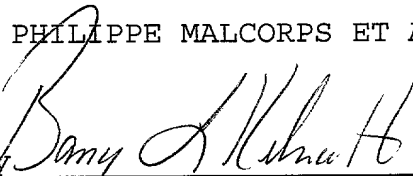
An early action on the merits is solicited.

Should the Examiner believe an additional amendment is needed to place the case in condition for allowance, he is invited to contact the undersigned attorney at the telephone number listed below.

Should the Commissioner determine that a fee is due as a result of this Amendment, he is hereby authorized to charge said fee to Deposit Account No. 02-0184.

Respectfully submitted,

PHILIPPE MALCORPS ET AL.

BY   
Barry L. Kelmachter  
Attorney for Applicants

Area Code: 203  
Telephone: 777-6628  
Telefax : 865-0297

Date: April 21, 1999

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(Date of Deposit)

Nicole Porto  
Name and Reg. No. of Attorney  
  
Signature

April 21, 1999  
Date of Signature

EXPRESS MAIL NO.:  
EL194866823US

WO 98/18902

PCT/IB96/01171

FERMENTED BEVERAGE WITH BEER WORT BASE, METHOD FOR  
PREPARING SAME

5 The present invention relates to a fermented beverage with beer wort base.

It also relates to a method for preparing a fermented beverage with beer wort base.

It finally relates to a use of compounds for enhancing some of the qualities of fermented beverages.

10 Generally, the preparation of a Pils-type beer uses a series of steps designed to obtain a beer which is as clear as possible. These various steps comprise in particular precipitation, adsorption, centrifugation and filtration of the beer wort. Pils-type beers are  
15 then considered as being colloiddally stable when they no longer develop any haze at the end of their preparation cycle and during their storage.

In contrast to Pils-type beers, in order to be liked by the consumer, some special beers have the main  
20 characteristic of exhibiting, at the time of their consumption, a haze which is abundant and persistent to a greater or lesser degree and which gives them the appearance of an unfiltered beer and confers on them a nonindustrial and natural character.

25 In these type of beers, the haze is generally due to the presence of yeasts, of suspended particles, mainly proteins, which may be very different in size and compositions. Indeed, the main fraction of the suspension depends on the method of preparation and the  
30 conditions for storing the finished beer, especially on the prior duration of decantation and on the temperature at which it is carried out.

Two main types of haze are generally distinguishable according to their behaviour as a  
35 function of the temperature.

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on April 21, 1999

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Nicole Porto

Name and Reg. No. of Attorney

Nicole Porto  
Signature

April 21, 1999  
Date of Signature

EXPRESS MAIL NO.:  
EL194866823US

The first type corresponds to so-called irreversible hazes which remain after heating the beer to a temperature of the order of 15°C. The main particles encountered in irreversible hazes are especially yeasts, protein or starch particles and oxalate crystals.

The second type corresponds to the so-called reversible hazes which form during cooling of the beer to the temperature for consumption, generally less than about 12°C, and which disappear completely or partially with heating of the beer. Reversible haze mainly consists of proteins and polyphenols.

After preparation, most of the hazes encountered in beers tend to sediment during storage, finally giving a beer which is clarified to a greater or lesser degree as well as a deposit.

This deposit can be resuspended by shaking at the time the beer is served, so as to again obtain a beverage having an adequate haze.

It can be easily understood, however, that such a way of operating is not systematically observed by the consumer.

It is therefore important for the brewer to be able to offer a beer having a haze of good quality and capable of persisting, at least until the beer is consumed, without the need for a specific operation by the consumer.

The aim of the invention is to respond, to a large degree, to this aim by providing a new fermented beverage with beer wort base having an improved haze.

A first object of the present invention is to provide a fermented beverage with beer wort base whose haze stability is improved.

5 Another object of the present invention relates to a method for preparing a fermented beverage with beer wort base having a haze with improved persistence.

10 Another object of the present invention relates to the use of specific compounds for stabilizing the hazes in fermented beverages with beer wort base.

15 The fermented beverage according to the invention, with beer wort base, is characterized in that it comprises a natural or synthetic additive capable of forming at least temporarily stable complexes with protein fractions of the said wort or of the said beverage, or of forming a suspension at least temporarily stable in the said wort or the said beverage, the said additive being present in the said fermented beverage, at least during its preparation, in  
20 a proportion sufficient for obtaining a satisfactory haze in the finished beverage.

25 The inventors of the present patent application have indeed discovered, surprisingly, that the hazes could be improved by the action of compounds capable of inhibiting the coagulation and precipitation of the proteins contained in the wort used to prepare the said beverage or in the finished beverage, forming for example with them complexes which are stable for a certain period, or forming a suspension in the wort.

30 According to the invention, the additive is soluble in water. Within the framework of the present invention, "soluble in water" is understood to mean

a product which can form an aqueous solution at a concentration of at least about 10 mg/l of water.

Advantageously, the additive consists of one or more polysaccharides chosen from the group comprising in particular starch derivatives, cellulose derivatives, pectin or its derivatives, in particular amidated pectin (E 440), carbohydrate gums or their derivatives.

There may be mentioned by way of nonlimiting examples of cellulose derivatives which can be used within the framework of the present invention hemicellulose, microcrystalline cellulose (E 460), methyl cellulose (E 461), hydroxypropylcellulose (E 463), hydroxypropylmethylcellulose (E 464), methylethylcellulose (E 465) and carboxymethylcellulose (E 466).

There may be mentioned as nonlimiting examples of starch derivatives which can be used within the framework of the present invention the modified starches E 1404 to E 1450 as described in the European Directive 95/2/EC No. L61/1 of 20/02/1995.

There may be mentioned as nonlimiting examples of gums which can be used within the framework of the present invention xanthan gum (E 415), gum tragacanth (E 413), gum acacia, alginic acid (E 400) and its salts, especially of sodium (E 401), of potassium (E 402), of ammonium (E 403), of calcium (E 404), propylene glycol alginate (E 405), karaya gum (E 416).

Other polysaccharides which can be used within the framework of the present invention comprise those belonging to the family of carrageenans.

The numbers corresponding to the European legislation in the area of food products for some of

the products which can be used within the framework of the present invention, from the publication Eurofood Monitor, European Union Legislation on Foodstuffs, Agra Europe (London) Ltd., are indicated in the preceding  
5 text.

According to a first embodiment of the present invention, the additive comprises a polysaccharide as defined above.

10 According to another embodiment of the present invention, the additive comprises a mixture of several polysaccharides as defined above.

The subject of the invention is also a method for preparing a fermented beverage with beer wort base. The method according to the invention preferably  
15 comprising the steps of cooking, boiling, cooling, fermenting the wort and of storing the beverage obtained, is characterized in that a natural or synthetic additive capable of forming at least temporarily stable complexes with protein fractions of  
20 the said wort or of the said beverage or of forming a suspension at least temporarily stable in the said wort or the said beverage is added during the preparation of the said beverage.

It is not necessary to describe in greater  
25 detail here the steps of cooking, boiling or fermenting the wort. These indeed correspond to those commonly used in the brewing industry. Persons skilled in the art can refer to conventional mashing, malting and hopping techniques, as described, for example, in the  
30 publication "Bières et Coolers [Beers and Coolers]" M. Moll, Collection Sciences et Techniques agro-alimentaires, Apria, Paris 1991.

According to the invention, the additive essentially consists of one or more polysaccharides as defined in the preceding text.

5           The additive is added, in powdered form or preferably in the form of an aqueous solution, at any of the steps of preparing the fermented beverage. According to a first embodiment of the present invention, the additive is added at any time between  
10 the beginning of the step of boiling the wort and the beginning of the step of cooling the wort.

According to yet another embodiment of the method of the present invention, the additive is added to the finished product.

15           The additive is added according to the invention in a proportion ranging from about 5 to about 2000 mg/l of wort or beverage, preferably about 10 to about 1000 mg/l of wort or beverage, still more preferably from about 50 to about 500 mg/l of wort or  
20 beverage.

The lower proportions used depend on the type of polysaccharide used, the physicochemical composition of the beverage, the time of adding and the degree of purity of the polysaccharide.

25           The criterion of purity of the polysaccharides is not an essential factor for the application of the invention because the proportions applied simply have to be adjusted as a consequence. Thus, for example, pectin may be introduced in the form of a crude or  
30 impure source, such as a fruit fraction, extract or concentrate.

In the specific case where the polysaccharide has to be extracted and solubilized during the method, the preferred form for addition is in the hot wort.



Higher proportions are generally limited by problems of secondary effects of visual or organoleptic deviation which is specific to each polysaccharide and each type of beverage, such as for example the formation of a precipitate, an excessively high viscosity, a destabilization of the foam, or the appearance of unacceptable tastes.

Persons skilled in the art will easily find the optimum conditions for addition which are characteristic to their own beverage by carrying out a limited series of systematic empirical trials.

The subject of the invention is also the use, for increasing the quality of the hazes of fermented beverages prepared from beer wort, of one or more natural or synthetic water-soluble polysaccharides capable of forming at least temporarily stable complexes with protein fractions of the beer wort or of forming a suspension at least temporarily stable in the said wort or the said beverage.

According to the invention, the polysaccharides which can be used are as defined in the preceding text.

Additional advantages and characteristics of the invention will also appear in the light of the more detailed description which follows of exemplary embodiments of the present invention which are given purely by way of illustration and with no limitation being implied, and the figures relating thereto and in which:

- Figure 1 is a graph representing the effect on the protein break of an additive according to the invention;

- Figure 2 is a graph illustrating the effect on the haze of a wort of increasing proportions of an additive according to the invention;

5       - Figure 3 is a representation by histograms of the size distribution of protein particles of a first beer sample which has received no additive according to the invention;

10       - Figure 4 is a representation by histograms of the size distribution of protein particles of a second beer sample which has received an additive according to the invention; and

15       - Figure 5 is a graph representing the change in the haze in two beer samples as a function of the duration of storage in the cold and of the temperature at which the beer is served.

20       The basic principle of the invention is to produce complexes between the polysaccharides introduced and the proteins in the wort or in the beer. Depending on the reactivity of the polysaccharides and their time of use, these complexes may spontaneously precipitate in the form of a haze, or may modify the conditions for precipitation of proteins during the process or in the finished beer.

25       Gum acacia contains a glycoprotein fraction which possesses properties for stabilizing colloidal systems. The reactivity of this gum is weak in the sense that it does not create immediate haze in the beer, but its effect becomes perceptible during the formation, from decantation, of the reversible cold haze. This gum is preferably added at the end of the process in order to avoid its thermal degradation.

30

Pectin reacts with proteins which precipitate during the cooling of the wort or of the beer. It follows that the first result of an addition to hot wort will be the formation of a permanent haze which will remain during the process and in the finished beer, and the second result will be to modify the conditions for the formation and precipitation of the reversible cold haze in the finished beer.

Pectin may also be introduced into the beer so as to preferentially act on the stabilization of the reversible fraction of the haze formed at low temperature.

The addition of carrageenans to the wort is a common practice in brewery in order to promote the clarification of the wort by accelerating the precipitation and the flocculation of protein break. In the invention, the high reactivity of carrageenans towards proteins is on the contrary exploited in order to create and maintain a permanent haze in the beer at room temperature. The action of this polysaccharide also manifests itself in slowing down the speed of sedimentation of the protein particles in the haze which forms during the cooling of the finished beer.

#### Example 1

In this example, the effect of an additive in accordance with the invention on the quality of the haze of a beer is studied.

To do this, two beer wort samples are collected during a cycle for production of a special beer, during the cooking step. The first sample (sample A) receives no additive and serves as a control. The second sample (sample B) receives an additive consisting of pectin, in a proportion of 0.30 g/l of wort.

The pectin used is the product commercially available under the name Pectine Q 40 from the company Sanofi, France.

5           The two samples A and B are placed in 500-ml graduated tubes.

10           The quality of the haze of the two worts is evaluated in the following manner. The decantation volume of the protein break containing the protein fractions coagulated and which have precipitated is measured.

This method of evaluating the haze of the wort is in particular described in the publication "Bières et Coolers", Paris, 1991, p 130.

15           Now with reference to Figure 1, it appears that the formation of the protein break of sample B (curve C2) is slowed down, in comparison of that of sample A (curve C1).

20           Given that a rapid and high protein break corresponds to a weak persistent haze, pectin therefore acts as a factor inhibiting and reducing the protein break, and consequently as a factor which increases the quality of the haze in the beer.

25           This is clearly demonstrated in Figure 2, which shows the effect of the concentration of pectin Q40 added to the hot wort on the formation of haze at 20°C in the cooled and centrifuged wort.

The results indicated in Figure 2 are obtained in the following manner:

30           The hot wort (100°C) is collected at the end of the cooking step and divided into samples without addition of pectin (0 g/l), or with addition of pectin (0.1 g/l, 0.2 g/l, 0.3 g/l, 0.5 g/l, 0.75 g/l or 1 g/l). After dissolution of the pectin by gentle stirring for 5 min, the samples of wort are cooled to 35 20°C and centrifuged (2500 × g, 15 min). The haze is

measured in each supernatant, by absorbance (A 700 nm) or by nephelometry (EBC units).

The relative distribution of the size of the protein particles in the beers obtained from the two worts of type A and B is then measured by photon correlation spectroscopy using a Mastersizer apparatus (Malvern Instruments, Great Britain). The results are given in Figures 3 and 4.

It appears from Figure 3 that the type A beer particles possess a mean diameter of about 0.8  $\mu\text{m}$  whereas with reference now to Figure 4, the type B beer particles possess a mean diameter of about 0.3  $\mu\text{m}$ , demonstrating the role of pectin in the inhibition of coagulation and of the precipitation of the proteins in the wort.

The two beers A and B are then stored at 0°C for two weeks. The haze is evaluated by measuring the absorbance at 700 nm by visible UV spectrometry (1 cm cell) after 24 hours, one week, two weeks and three weeks of storage, and by heating the beer from 0°C to 20°C.

It appears in Figure 5 that the intensity of the hazes of the two beer samples decreases during storage but that the beer which did not receive pectin (curve C3) possesses a haze of lower intensity than the beer which received pectin (curve C4).

The improvement in the stability of the haze during storage appears through the expression of two phenomena. On the one hand, the so-called "permanent" haze because it persists after heating to 20°C in glass, is 4 to 10 times higher in the test compared with the beer without pectin, even after a prolonged period of decantation at 0°C. Moreover, the fraction of the so-called "reversible" cold haze, calculated by the difference between the value measured at 2°C and that

measured at 20°C, is also higher in the test, compared with the beer without pectin, after 3 weeks of decantation at 0°C. The latter stabilizing effect on the reversible fraction of the haze is similar to that described in Table 1 in the annex.

Example 2

In this example, several additives according to the invention are tested.

The additives used in Example 2 are no longer added during the cooking of the wort, as was the case in Example 1, but to the finished beer. The samples are stored at 0°C for a period of four weeks. The haze of the decanted beer is evaluated at 2°C and after heating in a glass at 20°C, using the same method as that described in Example 1.

The results are given in Table 1 presented in the annex of the present patent application.

It appears from the results obtained that all the additives used have an effect of slowing down the speed of sedimentation of the reversible fraction of the haze of the beer and consequently prolong the persistence of the haze in the product. On the other hand, the proportions to be used for each product can vary considerably from one product to another.

The carrying out of the invention allows the production of beverages possessing a permanent haze of good quality for at least four weeks, at a storage temperature of 20°C, and of beverages possessing a reversible haze of good quality for at least three weeks, at a storage temperature of 0°C.

In the specific case of the additive 2 (carregeenan), a slight increase in the permanent haze measured at 20°C is also observed (0.074 A on average, at least 0.027 A in the control).

It goes without saying that the present invention is not intended to be limited to the exemplary embodiments which have just been described,  
5 but encompasses on the contrary all the variants.

Persons skilled in the art will have all the time to adapt the present invention to their own needs simply by carrying out optimization operations without as a result departing from the scope of the essential features thereof, as defined in the claims which follow.

Annex

Table 1

5

Duration of storage at 0°C	Control beer without additive		Additive 1		Additive 2		Additive 3	
T (°C)	2	20	2	20	2	20	2	20
7 days	0.310	0.037	0.527	0.029	0.521	0.099	0.484	0.020
14 days	0.102	0.029	0.416	0.057	0.352	0.096	0.241	0.019
21 days	0.083	0.038	0.377	0.037	0.285	0.084	0.165	0.020
28 days	0.052	0.027	0.161	0.016	0.242	0.074	0.097	0.020

Additive 1: gum acacia, commercially available from the company Janssen Pharmaceuticals, Belgium, at a dose of 1000 mg/l of beer.

10

Additive 2: carrageenan  $\lambda$  satia gum E, commercially available from the company Sanofi, France, at a dose of 10 mg/l of beer.

Additive 3: pectin Q40 (70 to 80% purity), commercially available from the company Sanofi, France, at a dose of 100 mg/l of beer.

15



Claims

- 5 1. Fermented beverage, with beer wort base, characterized in that it comprises a natural or synthetic additive capable of forming at least temporarily stable complexes with protein fractions of the said wort or of the said beverage and of forming a  
10 suspension at least temporarily stable in the said wort or the said beverage, the said additive being moreover present in the said fermented beverage, at least during its preparation, in a proportion sufficient for obtaining a satisfactory haze in the finished beverage.
- 15 2. Fermented beverage according to Claim 1, characterized in that the additive essentially consists of one or more polysaccharides.
3. Fermented beverage according to Claim 2, characterized in that the said polysaccharide is chosen  
20 from the group comprising especially starch derivatives, cellulose derivatives, pectin or derivatives of pectin, especially amidated pectin, carbohydrate gums or derivatives of carbohydrate gums, or mixtures thereof.
- 25 4. Fermented beverage according to Claim 3, characterized in that the starch derivatives comprise especially the modified starches E 1404 to E 1450, or mixtures thereof.
- 30 5. Fermented beverage according to Claim 3, characterized in that the cellulose derivatives comprise especially hemicellulose, microcrystalline cellulose, methyl cellulose, hydroxypropylcellulose, hydroxypropylmethylcellulose, methylethylcellulose and carboxymethylcellulose, or mixtures thereof.

6. Fermented beverage according to Claim 3, characterized in that the gums comprise especially xanthan gum, gum acacia, gum tragacanth, alginic acid and its salts, especially of sodium, of potassium, of ammonium, of calcium, propylene glycol alginate, karaya gum, or mixtures thereof.
7. Fermented beverage according to Claim 2, characterized in that the additive comprises carrageenans or mixtures thereof.
8. Fermented beverage according to any one of Claims 1 to 7, characterized in that the additive is soluble in water at a concentration of at least about 10 mg/l.
9. Method for preparing a fermented beverage with beer wort base, preferably comprising the steps of cooking, boiling, cooling, fermenting the wort and of storing the beverage obtained, characterized in that a natural or synthetic additive capable of forming at least temporarily stable complexes with protein fractions of the said wort or of the said beverage or of forming a suspension at least temporarily stable in the said wort or the said beverage is added during the preparation of the said beverage.
10. Method according to Claim 9, characterized in that the additive essentially consists of one or more polysaccharides.
11. Method according to Claim 10, characterized in that the said polysaccharide is chosen from the group comprising especially starch derivatives, especially the modified starches E 1404 to E 1450, the cellulose

- derivatives, especially hemicellulose, microcrystalline cellulose, methyl cellulose, hydroxypropylcellulose, hydroxypropylmethylcellulose, methylethylcellulose and carboxymethylcellulose; pectin or derivatives of
- 5 pectin, especially amidated pectin, carbohydrate gums or derivatives of carbohydrate gums, especially xanthan gum, gum acacia, gum tragacanth, alginic acid and its salts, especially of sodium, of potassium, of ammonium, of calcium, propylene glycol alginate, karaya gum;
- 10 carrageenans or mixtures thereof.
12. Method according to Claim 9 or 11, characterized in that it comprises the addition of about 5 to about 2000 mg of additive per litre of wort or beverage, preferably from about 10 to about 1000 mg
- 15 of additive per litre of wort or beverage.
13. Method according to any one of Claims 9 to 12, characterized in that it comprises the addition of about 50 to about 500 mg of additive per litre of wort or beverage.
- 20 14. Method according to any one of Claims 9 to 13, characterized in that the additive is added between the beginning of the wort boiling step and the beginning of the wort cooling step.
15. Method according to any one of Claims 9 to 13,
- 25 characterized in that the additive is added to the finished beverage.
16. Method according to any one of Claims 9 to 15, characterized in that the additive is soluble in water at a concentration of at least 10 mg/l.

17. Use, for the purpose of improving the haze of a fermented beverage prepared from beer wort, of a natural or synthetic water-soluble additive capable of forming at least temporarily stable complexes with protein fractions of the said wort or the said finished beverage or of forming a suspension at least temporarily stable in the said wort or the said beverage.

18. Use according to Claim 17, characterized in that the additive essentially consists of one or more polysaccharides as defined in any one of Claims 2 to 8.

1/3

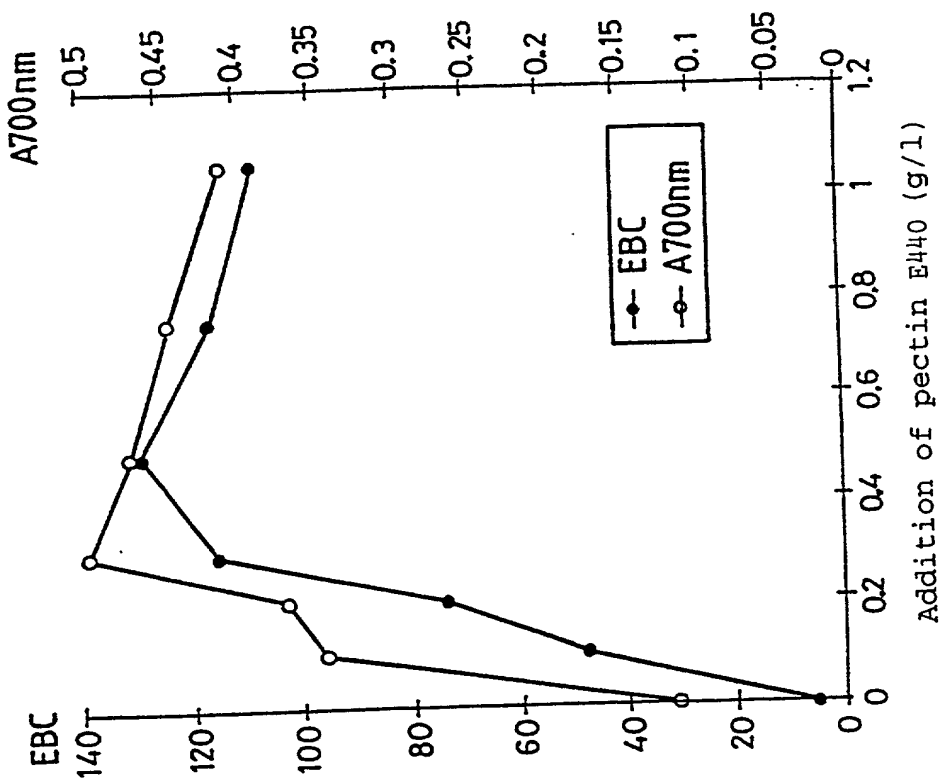


FIG-2

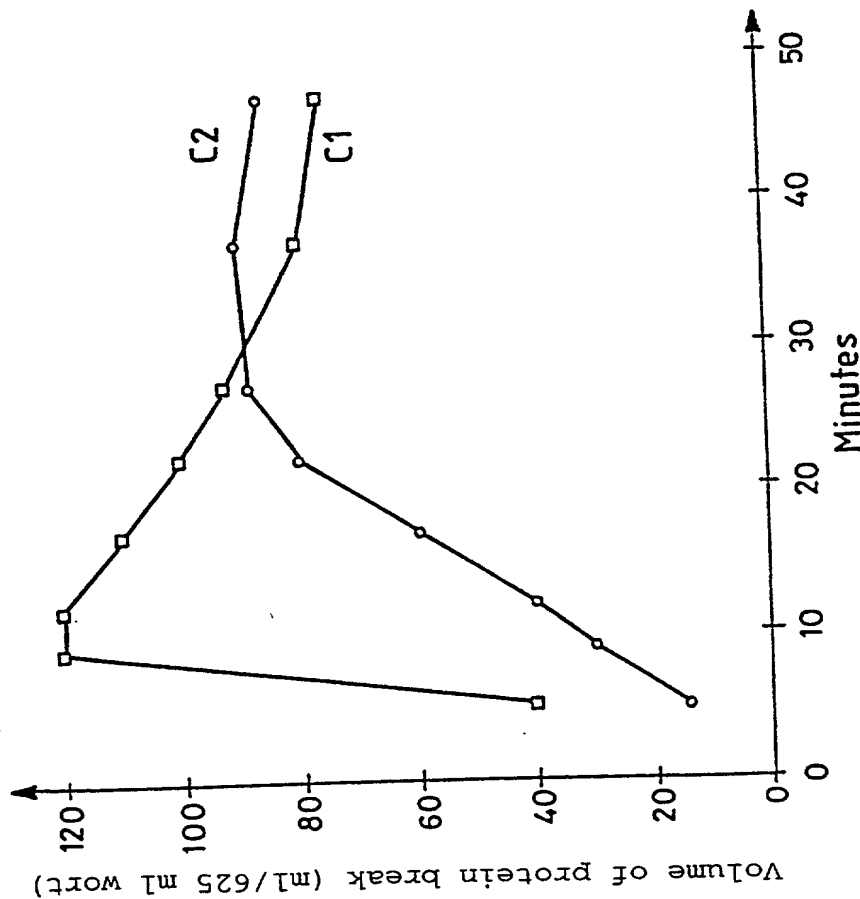
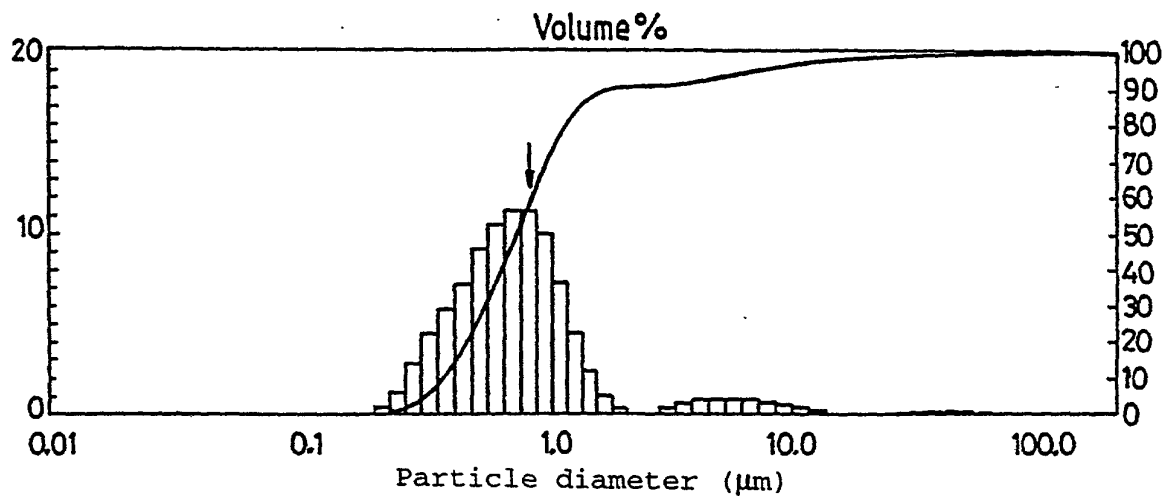
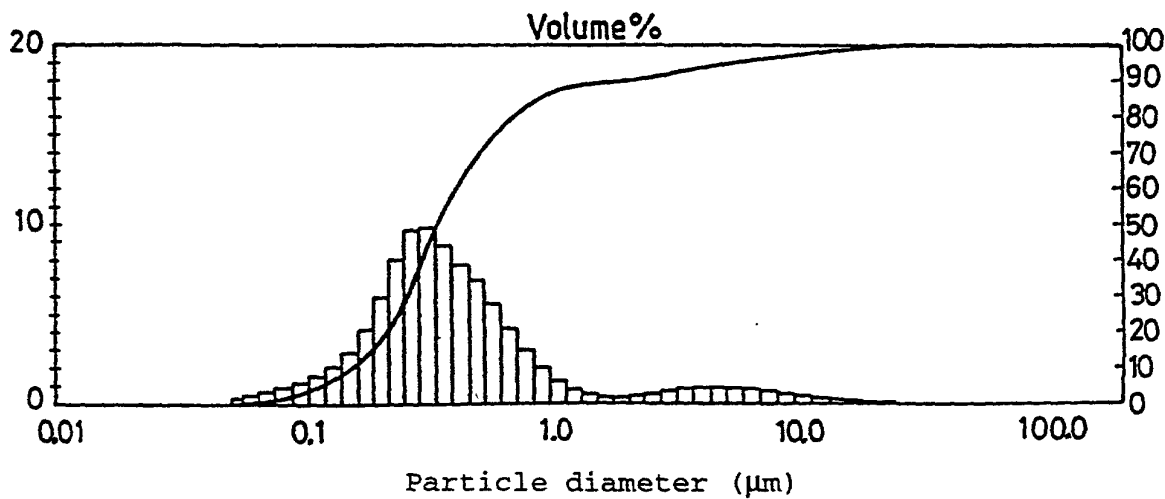


FIG-1

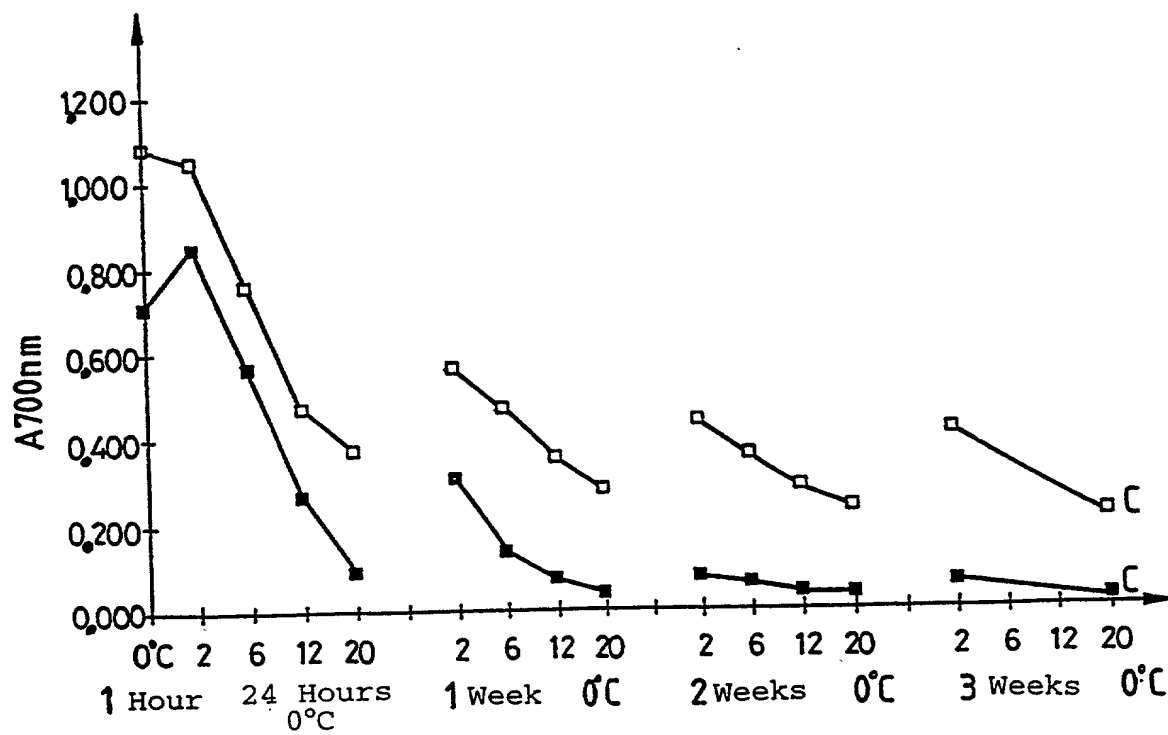
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2/3

FIG\_3FIG\_4

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3/3

FIG\_5

**PATENT**Attorney's Docket No. 99-260

USSN 09/284,816

**COMBINED DECLARATION AND POWER OF ATTORNEY**(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,  
CONTINUATION OR CIP)

As a below named inventor, I hereby declare that:

**TYPE OF DECLARATION**

This declaration is of the following type: (check one applicable item below)

- ☐ original  
☐ design  
☐ supplemental

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

- ☒ national stage of PCT

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR CIP.

- ☐ divisional  
☐ continuation  
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**INVENTORSHIP IDENTIFICATION**

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**TITLE OF INVENTION**FERMENTED BEVERAGE WITH BEER WORT BASE, METHOD FOR PREPARING SAME**SPECIFICATION IDENTIFICATION**

the specification of which: (complete (a), (b) or (c))

- (a) ☐ is attached hereto.  
 (b) ☐ was filed on \_\_\_\_\_ as ☐ Serial No. 0 / \_\_\_\_\_  
 or ☐ Express Mail No., as Serial No. not yet known \_\_\_\_\_  
 and was amended on \_\_\_\_\_ (if applicable).

NOTE: Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

- (c) ☒ was described and claimed in PCT International Application No. PCT/IB96/01171 filed on October 31, 1996 and as amended under PCT Article 19 on \_\_\_\_\_ (if any).

(Declaration and Power of Attorney [1-1]—page 1 of 5)



## ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information

- ☒ which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56

*(also check the following items, if desired)*

- ☒ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent, and
- ☐ In compliance with this duty there is attached an information disclosure statement in accordance with 37 CFR 1.98.

## PRIORITY CLAIM (35 U.S.C. § 119)

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

*(complete (d) or (e))*

- (d) ☒ no such applications have been filed.
- (e) ☐ such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

### A. PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>

(Declaration and Power of Attorney [1-1]—page 2 of 5)

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

**NOTE:** If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete **ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CIP APPLICATION** for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.

**POWER OF ATTORNEY**

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

4 Robert H. Bachman (19,374), Gregory P. LaPointe (28,395),  
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(check the following item, if applicable)

- ☐ Attached as part of this declaration and power of attorney is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

**SEND CORRESPONDENCE TO**

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**DIRECT TELEPHONE CALLS TO:**  
(Name and telephone number)

Barry L. Kelmachter  
(203) 777-6628

**DECLARATION**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

## SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.

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(MIDDLE INITIAL OR NAME)

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Country of Citizenship

Residence

Post Office Address

Full name of 5th joint inventor, if any

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(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature

Date

Country of Citizenship

Residence

Post Office Address

(Declaration and Power of Attorney [1-1]—page 4 of 5)

**CHECK PROPER BOX(ES) FOR ANY OF THE FOLLOWING ADDED PAGE(S) WHICH  
FORM A PART OF THIS DECLARATION**

- ☐ Signature for sixth and subsequent joint inventors. *Number of pages added* \_\_\_\_\_  
\* \* \*
- ☐ Signature by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* \_\_\_\_\_  
\* \* \*
- ☐ Signature for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. *Number of pages added* \_\_\_\_\_  
\* \* \*
- ☐ Added page for signature by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time (37 CFR 1.47).  
\* \* \*
- ☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.  
☐ *Number of pages added* \_\_\_\_\_  
\* \* \*
- ☐ Authorization of attorney(s) to accept and follow instructions from representative.  
\* \* \*

*(If no further pages form a part of this Declaration, then end this Declaration with this page and check the following item:)*

☒ This declaration ends with this page.